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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/018,303	10/30/2001	Osamu Sakai	10059-400US (P23013-01)	4864
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2005 MARKET STREET, SUITE 2200  
PHILADELPHIA, PA 19103-7013

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

15

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/018,303	SAKAI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4 is/are rejected.
- 7) ☒ Claim(s) 2 and 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |                                                                                                              |                                                                             |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group 1, claims 1-4, drawn to a polymer electrolyte fuel cell comprising specific retaining plates.

Group II, claim 5, drawn to a method of using a polymer electrolyte fuel cell.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: *in this case*, the special technical feature i.e. the retaining plate forming a gap between unit cells to remove them is known in the art and thus, it does not provide a contribution over the prior art as evidenced by the US 6190793 patent.

3. During a telephone conversation with William W. Schwarze on 05/19/03 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-4. Affirmation of this election must be made by applicant in replying to this Office action. Claim 5 was withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Priority***

5. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Information Disclosure Statement***

6. The information disclosure statement (IDS) submitted on 10/30/01 was considered by the examiner.

***Drawings***

7. Figures 1-2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 51-59. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

9. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed

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150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," "The present specification", etc.

### ***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Barton et al US

6190793.

The instant application is directed to a fuel cell wherein the disclosed inventive concept comprises the specific retaining plate forming gap to retain and compress the fuel cell units.

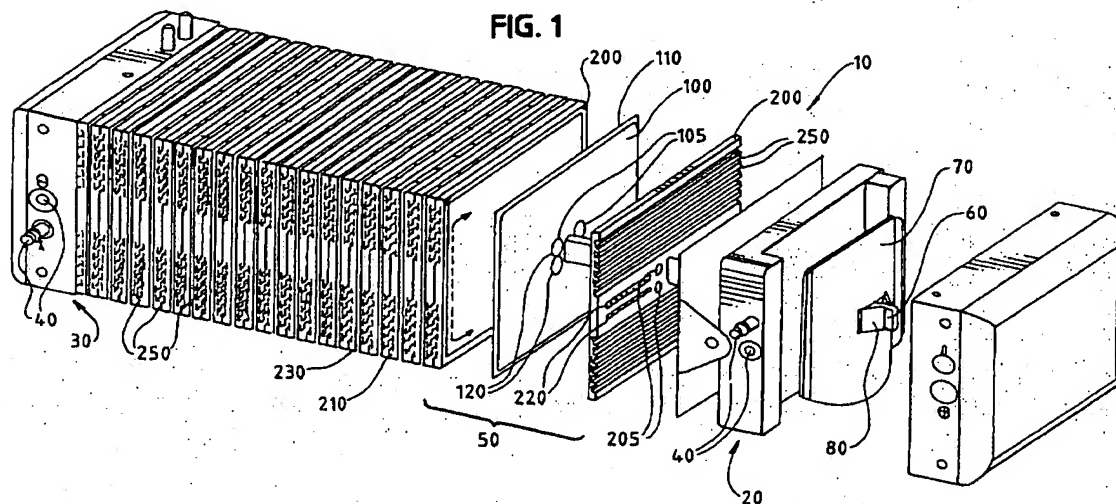
Other limitations include the specific retaining plate and separator configuration; the voltage measurement features and the method of operating the fuel cell.

With respect to claim 1:

Barton et al disclose an electrochemical fuel cell stack with an improved compression assembly (TITLE). Figure 1 illustrates a solid polymer electrochemical fuel cell stack 10 including a pair of end plate assemblies 20 and 30, and a plurality of stacked fuel cell assemblies

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50, each comprising an MEA 100, and a pair of flow field plates 200 (*the flow field plates are also known in the art as separators*) (COL 7, lines 64-67). As illustrated in Figure 1, each MEA 100 is positioned between the active surfaces of two flow field plates 200. Each flow field plate 200 has flow field channels 210 on the active surface thereof (which contacts the MEA) for distributing fuel or oxidant fluid streams to the active area of the MEA 100 (COL 8, lines 23-33). In the illustrated embodiment, flow field plates 200 have a plurality of open-faced parallel channels 250 formed in the non-active surface thereof (COL 8, lines 34-39).



Barton et al also disclose that solid polymer electrochemical fuel cells generally employ a membrane electrode assembly (MEA) consisting of a solid polymer electrolyte membrane disposed between two electrodes layers (COL 1, lines 20-26). In typical fuel cells, the MEA is disposed between two electrically conductive separator plates or fluid flow field plates (COL 1, lines 31-39). Fluid flow field plates have at least one flow passage formed therein to direct the fuel and oxidant fluid streams to the respective electrode layers, namely the anode on the fuel side and the cathode on the oxidant side. In a single cell arrangement, fluid flow field plates are provided on each of the anode and cathode sides (COL 1, lines 31-39). It is further disclosed that

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two or more fuel cells can be connected together to increase the overall power output of the assembly. In series arrangements, one side of a given plate serve as an anode plate for one cell and the other side of the plate can serve as the cathode plate for the adjacent cell, such a series of connected multiple fuel cell arrangement is referred to as a fuel cell stack (COL 1, lines 40-47).

It is disclosed that an elongate tension member extends between and through the end plate assemblies 20 and 30 to retain and secure stack 10 in its assembled state. It is further disclosed that spring plate 70 along with end plates 20 apply a compressive force to fuel cell assemblies 50 of stack 10 and act as restraining members (COL 8, lines 1-7). *It is apparent from Figure 1 above that the end plate assemblies 20, 30 form a gap therebetween so as to accommodate the fuel cell units in a sandwiched arrangement (that is, the end plate assemblies are spaced apart so as to dispose between the two of them the fuel cell units).*

*It is also apparent from Figure 1 above that a laminated and compressed configuration is formed when all components of the solid polymer fuel cell stack with a compression assembly comprising the tension member and a spring plate acting as a unitary resilient restraining member are put together. That is, they all become united into a single unit by compression means and/or a single unit is made by uniting or holding together superposed layers of the MEA, the separator (fluid flow field plate) and the end plates.*

Barton et al further disclose that corrective action for electrocatalyst poisoning typically requires the fuel cell to be shut down. For electrocatalyst which is severely poisoned, it may be necessary to dismantle the fuel cell stack and replace the MEAs and the components which caused the contamination (COL 3, lines 15-20). Accordingly, there is a need for an improved compression assembly which mitigates some or all of the aforementioned disadvantages which

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are associated with conventional compression assemblies which employ conductive tension members (COL 3, lines 29-33). *Thus, Barton et al' teaching clearly envision that one of the advantage to use his fuel cell stack with an improved compression assembly is to be able to replace MEAs (membrane electrode assemblies or fuel cell units) which become poisoned. That is, replacing MEAs requires removing the poisoned MEA and re-installing a new MEA.*

Thus, the claim is anticipated.

### ***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al US 6190793 as applied to claim 1 above, and further in view of Sawyer 4198597.



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Barton et al is applied, argued and incorporated herein for the reasons above. However, Barton et al do not expressly disclose the voltage measurement jig and the voltage display device.

With respect to claim 4:

Sawyer et al disclose a negative cell detector for a multi-cell fuel cell stack (TITLE). Sawyer et al disclose a detector for sensing defective cells among a plurality of producing cells forming a source of electrical power (ABSTRACT). The invention relates to a detector for sensing one or more negative cells in a multicelled module and more particularly, to a detector apparatus for continuously monitoring each voltage producing cell of a module in fuel cells to identify faulty or inoperative cells (col 1, lines 6-12).

A series of light emitting diodes are coupled to the positive and negative junction of each voltage producing cell so that they are biased to a nonconducting state so long as the cell has a positive output voltage (ABSTRACT). In the event that a cell becomes defective causing its voltage output to drop, the voltage produced by the remaining cells create a load current by which the defective cell goes negative and forward biases the corresponding light emitting diode. In turn, the light emitting diode changes to its conductive state whereupon it emits light and identifies the defective cell (ABSTRACT).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the voltage measurement jig and the voltage display device of Sawyer et al into the fuel cell system of Barton et al as Sawyer et al discloses that such devices for detecting and displaying voltage are used for sensing defective cells among a plurality of voltage producing cells which together form a source of electrical power such as the fuel cell.

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Accordingly, the detector can be used to monitor cells whose voltage levels may be hundreds of volts above ground potential and yet is electrically isolated so that it does not create a safety hazard to the plant facilities or operating personnel. Further, the detector can be used to continuously monitor all the cells in a multi-celled power source to sense negative or non-voltage producing cells but it will only draw power when a particular cell is faulty. Moreover, the detector independently monitors each cell of a multicell power source for negative cells in a manner that any inherent voltage variation of the cells in the stack will not provide an erroneous fault indication. *Accordingly, this is necessary because a totally inoperative cell still connected thereto with the remaining cells of a multi-stacked fuel cell is a particular problem because, in addition, to having no output voltage, its internal impedance normally increases and actually causes a voltage drop across the cell during load conditions. The current forced through the faulty cell by the remaining cells of the stack causes power to be dissipated in the form of heat. This heat is conducted to cells adjacent to the bad cell and can create over-temperature conditions which will reduce the operating life of the adjacent cells.*

#### ***Allowable Subject Matter***

15. The following is a statement of reasons for the indication of allowable subject matter: a reasonable search for the prior art failed to reveal or fairly suggest what is instantly claimed, particularly: a) the retaining plate composed of two plates having the specific structural configuration as recited in claim 2; and b) the separator plate and the retaining plate satisfying the specific structural arrangement as recited in claim 3. For example, the prior art of record i.e. Barton et al'793 and Sawyer'597 does not disclose these features.

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16. Note, with respect to claim 2: the transitional phrase “*composed of*” has been interpreted in the same manner as “consisting essentially of” based on the disclosed specification. That is to say, the transitional phrase “composed of” limits the scope of a claim to the specified materials (features) and those that do not materially affect the basic and novel characteristics of the claimed invention. (See MPEP 2111.03 Transitional Phrases - Other Transitional Phrases).

17. Claims 2 and 3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This prior art is pertinent because it was cited in an International Search Report. However, the examiner did not find it fully relevant for the following reasons: a) the JP 63-16576 discloses an air cooling type fuel cell comprising a specific distribution flow passage configuration so as to fully equalized the inner temperature of a fuel cell stack, however, the instant claims are directed to a polymer electrolyte fuel cell comprising specific retaining plates forming gap to retain and compress the fuel cell units.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro  
Examiner  
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A handwritten signature in black ink, appearing to read 'RAM', is written over the printed name 'Raymond Alejandro'.